

# Overload Relay Heater Tables

## Selection of Heater Elements for Overload Relays

General

**Use only when motor full load current is not known.** Motor amps will vary depending on the type and manufacturer of the motor. These average values, for motors with service factor of 1.15, are to be used only as a guide. The formulas at the bottom of the page may be used to obtain approximate amps for other motors.

**Note:** RPM shown for 60 cycle motors. For 50 cycle motors, multiply RPM by .83.

**CAUTION:** Actual motor amps may be higher or lower than the values listed below for a particular motor. For more reliable motor protection, select heater elements by using the full load motor nameplate amps.

**Single Phase** motor full load amps of the same horsepower, voltage and speed vary over wide ranges. The following table conforms with table 430.148 of the NEC.

### 1-Phase

Hp	Full Load Current (60Hz)	
	115 Volts	230 Volts
1/8	4.4	2.2
1/4	5.8	2.9
1/2	7.2	3.6
3/4	9.8	4.9
1	13.8	6.9
1 1/2	16	8
2	20	10
3	24	12
5	34	17
7 1/2	56	28
10	80	40
10	100	50

### 3-Phase

Hp	Syn Speed RPM	Full Load Current (60Hz)				50 Hz
		200 Volts	230 Volts	460 Volts	575 Volts	380 Volts
1/4	1800	1.09	0.95	0.48	0.38	0.55
	1200	1.61	1.40	0.70	0.56	0.81
	900	1.84	1.60	0.80	0.64	0.93
1/2	1800	1.37	1.19	0.60	0.48	0.64
	1200	1.83	1.59	0.80	0.64	0.92
	900	2.07	1.80	0.90	0.72	1.04
3/4	1800	1.98	1.72	0.86	0.69	0.99
	1200	2.47	2.15	1.08	0.86	1.24
	900	2.74	2.38	1.19	0.95	1.38
1	1800	2.83	2.46	1.23	0.98	1.42
	1200	3.36	2.82	1.46	1.17	—
	900	3.75	3.26	1.63	1.30	1.88
1 1/2	3600	3.22	2.80	1.40	1.12	1.70
	1800	4.09	3.56	1.78	1.42	2.06
	1200	4.32	3.76	1.88	1.50	2.28
2	3600	4.95	4.30	2.15	1.72	2.60
	1800	5.01	4.36	2.18	1.74	2.69
	1200	5.59	4.86	2.43	1.94	2.94
3	3600	6.07	5.28	2.64	2.11	3.20
	1800	6.44	5.60	2.80	2.24	3.39
	1200	6.44	5.60	2.80	2.24	3.39
4	3600	6.44	5.60	2.80	2.24	3.39
	1800	7.36	6.40	3.20	2.56	3.84
	1200	7.87	6.84	3.42	2.74	4.14
5	3600	9.09	7.90	3.95	3.16	4.77
	1800	9.59	8.34	4.17	3.34	5.02
	1200	10.8	9.40	4.70	3.76	5.70
7 1/2	3600	11.7	10.2	5.12	4.10	6.20
	1800	13.1	11.4	5.70	4.55	6.80
	1200	13.1	11.4	5.70	4.55	6.80
10	3600	15.5	13.5	5.76	5.41	8.20
	1800	16.6	14.4	7.21	5.78	8.74
	1200	18.2	15.8	7.91	6.32	9.59
15	3600	18.3	15.9	7.92	6.33	9.60
	1800	22.4	19.5	9.79	7.81	11.50
	1200	24.7	21.5	10.7	8.55	13.00
20	3600	25.1	21.8	10.9	8.70	13.20
	1800	26.5	23.0	11.5	9.19	13.90
	1200	29.2	25.4	12.7	10.1	15.40
25	3600	30.8	25.8	13.4	10.7	16.30
	1800	32.2	28.0	14.0	11.2	16.90
	1200	35.1	30.5	15.2	12.2	18.50
30	3600	41.9	36.4	18.2	14.5	22.00
	1800	45.1	39.2	19.6	15.7	23.70
	1200	47.6	41.4	20.7	16.5	25.00
40	3600	51.2	44.5	22.2	17.8	26.90
	1800	58.0	50.4	25.2	20.1	30.50
	1200	58.9	51.2	25.6	20.5	31.00
50	3600	60.7	52.8	26.4	21.1	31.90
	1800	63.1	54.9	27.4	21.9	33.20
	1200	63.1	54.9	27.4	21.9	33.20

### 3-Phase

Hp	Syn Speed RPM	Full Load Current (60Hz)				50 Hz
		200 Volts	230 Volts	460 Volts	575 Volts	380 Volts
25	3600	69.9	60.8	30.4	24.3	36.80
	1800	74.5	64.8	32.4	25.9	39.20
	1200	75.4	65.6	32.8	26.2	39.60
	900	77.4	67.3	33.7	27.0	40.70
30	3600	84.8	73.7	36.8	29.4	—
	1800	86.9	75.6	37.8	30.2	45.70
	1200	90.6	78.8	39.4	31.5	47.60
	900	94.1	81.8	40.9	32.7	49.50
40	3600	111	96.4	48.2	38.5	—
	1800	116	101	50.4	40.3	61.00
	1200	117	102	50.6	40.4	61.20
	900	121	105	52.2	41.7	63.20
50	3600	138	120	60.1	48.2	—
	1800	143	124	62.2	49.7	75.20
	1200	145	126	63.0	50.4	76.20
	900	150	130	65.0	52.0	78.50
60	3600	164	143	71.7	57.3	—
	1800	171	149	74.5	59.4	90.00
	1200	173	150	75.0	60.0	91.10
	900	177	154	77.0	61.5	93.10
75	3600	206	179	89.6	71.7	—
	1800	210	183	91.6	73.2	111.00
	1200	212	184	92.0	73.5	112.00
	900	222	193	96.5	77.5	117.00
100	3600	266	231	115	92.2	—
	1800	271	236	118	94.8	144.00
	1200	275	239	120	95.6	145.00
	900	290	252	126	101	153.00
125	3600	—	292	146	116	—
	1800	—	293	147	117	177.00
	1200	—	298	149	119	180.00
	900	—	305	153	122	186.00
150	3600	—	343	171	137	—
	1800	—	348	174	139	210.00
	1200	—	350	174	139	210.00
	900	—	365	183	146	211.00
200	3600	—	458	229	184	—
	1800	—	452	226	181	274.00
	1200	—	460	230	184	276.00
	900	—	482	241	193	279.00
250	3600	—	559	279	223	—
	1800	—	568	284	227	343.00
	1200	—	573	287	229	345.00
	900	—	600	300	240	347.00
300	1800	—	278	339	271	392.00
	1200	—	684	342	274	395.00
400	1800	—	896	448	358	—

#### Formula—Approximate Full Load Amps for Other Motors

208 Volt Full Load Amp  $\approx$  230 Volt current  $\times$  110%

2-Phase FLA  $\approx$  0.866  $\times$  the 3-Phase FLA

2-Phase, 3-wire current in common wire  $\approx$  1.41  $\times$  that in the other 2 lines

25Hz 1500 RPM, amps  $\approx$  amps of 60Hz, 3600 RPM

25Hz 750 RPM, amps  $\approx$  amps of 60Hz, 1800 RPM

Service factor 1.0  $\approx$  amps  $\times$  0.9

50°C–55°C motor  $\approx$  amps  $\times$  0.9

# Overload Relay Heater Tables

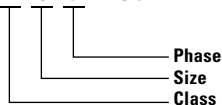
## Selection of Heater Elements for Overload Relays

**General**

To Select Heater Catalog Number Use

- Product Class
- Controller Size
- Motor Amp
- Phase

Catalog No 14 C P 3 2 B C 81



1. Find heater table number below, using the Product Class, Controller Size and Phase. Heater table number is found in the column under the type of overload and phase.

2. Refer to the specified table and use the controller size and motor amps to select the heater catalog number.

- a. If motor amps are not known, an approximate value may be found on the previous page. These values should be used with caution and only when motor amps are not available.

Heaters shown on the following pages provide a maximum trip rating of 125% of minimum motor amperes for 40°C motors (service factor 1.15). For other motors (service factor 1.0), select the next lower listed heater catalog number within the designated table which provides a maximum trip rating of approximately 115%.

Overload relays do not provide protection against short circuits. To ensure proper coordination with short circuit protective device, select heaters from the information packaged with the control device.

Class	Description	Size or Amperage	Controller Size Letter	Heater Table Number			
				Bimetal Standard Trip (Class 20)		Bimetal Quick Trip (Class 10)	
				Compensated E Heaters Green Reset		Compensated K Heaters Green Reset	
				1Ph	3Ph	1Ph	3Ph
SMF	Manual Magnetic	All	—	See Page 16-152			
14, 22	Non-reversing, Reversing	00-4	<b>B-J</b>	213	233	313	332
17, 18 25, 26 30, 32 <sup>ⓐ</sup> 83, 84 87, 89	Combination Reversing Combination Multi Speed Pump Controllers Motor Control Centers	0-4	<b>C-J</b>	—	233	—	332
48	Panel Mounted Overload Relay	25-180A	<b>D-J</b>	216	238	316	335

ESP200 starters do not require heater elements.

**ⓐ Overload Relay Selection Multi-Speed**

Each speed requires a separate set of overloads. The adjustment range must be selected on the basis of the full-load current for each particular speed.

# Manual Control

## Heater Elements, Class SMF

General



Heater Elements Class SMF

### Ordering Information

- Determine number of heater elements required from Table A.
- Determine motor full load current and service factor.  
**NOTE: If motor amps are unknown, an approximate value may be found on page 16-150. These values should be used with caution and only when motor amps are not available.**
- If the motor and controller are in the same ambient temperature:
  - For 1.15 to 1.25 service factor motors use 100% of motor full load current for heater element selection.
  - For 1.0 service factor motors use 90% of motor full load current for heater element selection.
  - Heater elements are class 20.
- If the motor and controller are in different ambient temperatures multiply motor full load current by the multiplier in Table B. Use the resultant full load current for heater element selection.
- Select proper heater element from table below.
- All tables are based on the operation of the motor and controller in the same ambient temperature, 40°C (104°F) or less. Always be certain the correct heater element is installed in the starter before operating the motor.

Heater Catalog Number	Motor Full-Load Current (Amps)	List Price \$
SMFH01	0.157-0.173	13.00
SMFH02	0.174-0.192	13.00
SMFH03	0.193-0.212	13.00
SMFH04	0.213-0.235	13.00
SMFH05	0.236-0.261	13.00
SMFH06	0.262-0.289	13.00
SMFH07	0.290-0.321	13.00
SMFH08	0.322-0.355	13.00
SMFH09	0.356-0.399	13.00
SMFH10	0.41-0.44	13.00
SMFH11	0.45-0.49	13.00
SMFH12	0.50-0.53	13.00
SMFH13	0.54-0.58	13.00
SMFH14	0.59-0.65	13.00
SMFH15	0.66-0.71	13.00
SMFH16	0.72-0.78	13.00
SMFH17	0.79-0.85	13.00
SMFH18	0.86-0.96	13.00
SMFH19	0.97-1.04	13.00
SMFH20	1.05-1.16	13.00
SMFH21	1.17-1.25	13.00
SMFH22	1.30-1.39	13.00
SMFH23	1.38-1.54	13.00
SMFH24	1.48-1.63	13.00
SMFH25	1.57-1.75	13.00
SMFH26	1.66-1.86	13.00

Heater Catalog Number	Motor Full-Load Current (Amps)	List Price \$
SMFH27	1.80-1.99	13.00
SMFH28	1.96-2.15	13.00
SMFH29	2.16-2.38	13.00
SMFH30	2.39-2.75	13.00
SMFH31	2.76-2.84	13.00
SMFH32	2.85-3.06	13.00
SMFH33	3.07-3.45	13.00
SMFH34	3.46-3.70	13.00
SMFH35	3.71-4.07	13.00
SMFH36	4.08-4.32	13.00
SMFH37	4.33-4.90	13.00
SMFH38	4.91-5.35	13.00
SMFH39	5.36-5.85	13.00
SMFH40	5.86-6.41	13.00
SMFH41	6.42-6.79	13.00
SMFH42	6.80-7.57	13.00
SMFH43	7.58-8.15	13.00
SMFH44	8.16-8.98	13.00
SMFH45	8.99-9.67	13.00
SMFH46	9.68-9.95	13.00
SMFH47	9.96-10.8	13.00
SMFH48	10.9-12.1	13.00
SMFH49	12.2-13.1	13.00
SMFH50	13.2-13.9	13.00
SMFH51	14.0-15.0	13.00
SMFH52	15.1-16.0	13.00

Table A  
Number of Heater Elements

Device	Number of Heater Elements	Notes
SMFF*1 SMFF*2 SMFF*3 SMFF*4 SMFF*5 SMFF*6	1	All single pole and two pole SMF starters require only 1 Heater Element.
SMFF*22 SMFF*44	2	Duplex Unit. One Heater Element per starter.
SMFF*11 SMFF*22	2	Two Speed Starter. One Heater Element per speed.

Table B—Special Applications  
Heater Element Selection

Continuous Duty Motor Service Factor	Ambient Temperature of Motor		
	Same as Controller Ambient	Constant 10°C (18°F) Higher Than Controller Ambient	Constant 10°C (18°F) Lower Than Controller Ambient
	Full Load Current Multiplier		
1.15 to 1.25	1.0	0.9	1.05
1.0	0.9	0.8	0.95

CONTROL PRODUCTS 16

NEMA & General Purpose Control

# Overload Relay Heater Tables

## Full Load Motor Amps, Single Phase, Trip Class 20 – Tables 213, 216

Selection

Table 213 for Class 14, 22 (1-Phase)

Full Load Amps			Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1P	Size 2, 2½		
0.37-0.40	—	—	E3	13.00
0.41-0.44	0.41-0.44	—	E4	13.00
0.45-0.47	0.45-0.47	—	E5	13.00
0.48-0.52	0.48-0.52	—	E6	13.00
0.53-0.57	0.53-0.57	—	E7	13.00
0.58-0.62	0.58-0.62	—	E8	13.00
0.63-0.69	0.63-0.69	—	E9	13.00
0.70-0.74	0.70-0.74	—	E11	13.00
0.75-0.81	0.75-0.81	—	E12	13.00
0.82-0.85	0.82-0.85	—	E13	13.00
0.86-0.93	0.86-0.93	—	E14	13.00
0.94-1.03	0.94-1.03	—	E16	13.00
1.04-1.11	1.04-1.11	—	E17	13.00
1.12-1.22	1.12-1.22	—	E18	13.00
1.23-1.34	1.23-1.34	—	E23	13.00
1.35-1.53	1.35-1.53	—	E24	13.00
1.54-1.71	1.54-1.71	—	E26	13.00
1.72-1.92	1.72-1.92	—	E27	13.00
1.93-2.12	1.93-2.12	—	E28	13.00
2.13-2.24	2.13-2.24	—	E29	13.00
2.25-2.43	2.25-2.43	—	E31	13.00
2.44-2.57	2.44-2.57	—	E32	13.00
2.58-2.86	2.58-2.86	—	E33	13.00
2.87-3.16	2.87-3.16	—	E34	13.00
3.17-3.35	3.17-3.35	—	E36	13.00
3.36-3.58	3.36-3.58	—	E37	13.00
3.59-3.90	3.59-3.90	—	E38	13.00
3.91-4.25	3.91-4.25	—	E39	13.00
4.26-4.77	4.26-4.77	—	E41	13.00
4.78-5.35	4.78-5.35	—	E42	13.00
5.36-5.76	5.36-5.76	—	E44	13.00
5.77-6.33	5.77-6.33	—	E46	13.00
6.34-6.98	6.34-6.98	—	E47	13.00
6.99-7.37	6.99-7.37	—	E48	13.00
7.38-7.71	7.38-7.71	—	E49	13.00
7.72-8.51	7.72-8.51	—	E50	13.00
8.52-9.31	8.52-9.31	—	E51	13.00
9.32-10.1	9.32-10.1	—	E52	13.00
10.2-10.9	10.2-10.9	—	E53	13.00
11.0-12.2	11.0-12.2	—	E54	13.00
12.3-13.5	12.3-13.5	—	E55	13.00
13.6-15.7	13.6-15.7	—	E56	13.00
15.8-17.3	15.8-17.3	19.4-22.0	E57	13.00
17.4-19.9	17.4-19.9	22.1-23.5	E60	13.00
20.0-21.7	20.0-21.7	23.6-25.0	E61	13.00
21.8-23.4	21.8-23.4	25.1-27.0	E62	13.00
23.5-24.0	23.5-23.7	27.1-28.9	E65	13.00
—	—	29.0-31.0	E66	13.00
—	—	31.1-34.8	E67	13.00
—	—	34.9-36.9	E69	13.00
—	32.3-34.0	37.0-43.9	E70	13.00
—	—	44.0-46.0	E72	13.00
—	—	46.1-48.3	E73	13.00
—	—	48.4-55.0	E74	13.00
—	—	55.1-60.0	E76	13.00

Table 216 for Class 48

Full Load Amps			Heater Catalog No	List Price \$
48DA, 48GA	48HA	48JA		
0.34-0.36	—	—	E3	13.00
0.37-0.40	—	—	E4	13.00
0.41-0.43	—	—	E5	13.00
0.44-0.47	—	—	E6	13.00
0.48-0.51	—	—	E7	13.00
0.52-0.56	—	—	E8	13.00
0.57-0.62	—	—	E9	13.00
0.63-0.67	—	—	E11	13.00
0.68-0.73	—	—	E12	13.00
0.74-0.77	—	—	E13	13.00
0.78-0.84	—	—	E14	13.00
0.85-0.93	—	—	E16	13.00
0.94-1.00	—	—	E17	13.00
1.01-1.10	—	—	E18	13.00
—	—	—	E19	13.00
1.11-1.21	—	—	E23	13.00
1.22-1.38	—	—	E24	13.00
1.39-1.54	—	—	E26	13.00
1.55-1.73	—	—	E27	13.00
1.74-1.91	—	—	E28	13.00
1.92-2.02	—	—	E29	13.00
2.03-2.19	—	—	E31	13.00
2.20-2.32	—	—	E32	13.00
2.33-2.58	—	—	E33	13.00
2.59-2.85	—	—	E34	13.00
2.86-3.02	—	—	E36	13.00
3.03-3.23	—	—	E37	13.00
3.24-3.52	—	—	E38	13.00
3.53-3.83	—	—	E39	13.00
3.84-4.30	—	—	E41	13.00
4.31-4.82	—	—	E42	13.00
4.83-5.19	—	—	E44	13.00
5.20-5.71	—	—	E46	13.00
5.72-6.29	—	—	E47	13.00
6.30-6.64	—	—	E48	13.00
6.65-6.95	—	—	E49	13.00
6.96-7.67	—	—	E50	13.00
7.68-8.39	—	—	E51	13.00
8.40-9.19	—	—	E52	13.00
9.20-9.94	—	—	E53	13.00
9.95-10.9	—	—	E54	13.00
11.0-12.2	—	—	E55	13.00
12.3-14.2	—	—	E56	13.00
14.3-15.6	—	—	E57	13.00
—	—	—	E59	13.00
15.7-17.9	—	—	E60	13.00
18.0-19.6	—	—	E61	13.00
19.7-22.3	—	—	E62	13.00
22.4-24.0	—	—	E65	13.00
24.1-25.9	—	—	E66	13.00
26.0-29.5	27.1-30.0	—	E67	13.00
29.6-32.5	30.1-33.2	—	E69	13.00
32.6-33.5	33.3-35.7	—	E70	13.00
33.6-36.9	35.8-39.4	—	E71	13.00
37.0-39.2	39.5-43.4	—	E72	13.00
39.3-43.1	43.5-46.9	—	E73	13.00
43.2-47.4	47.0-51.5	—	E74	13.00
47.5-50.0	51.6-57.0	—	E76	13.00
50.1-55.2	57.1-62.8	—	E77	13.00
55.3-60.0	62.9-69.1	—	E78	13.00
—	69.2-75.0	—	E79	13.00
—	75.1-83.3	—	E80	13.00
—	—	50.0-55.9	E88	13.00
—	—	56.0-60.9	E89	13.00
—	—	61.0-65.9	E91	13.00
—	—	66.0-69.9	E92	13.00
—	—	70.0-75.9	E93	13.00
—	—	76.0-81.9	E94	13.00
—	83.4-86.9	82.0-86.9	E96	13.00
—	87.0-92.9	87.0-92.9	E97	13.00
—	93.0-100.0	93.0-97.9	E98	13.00
—	—	98.0-107.9	E99	13.00
—	—	108.0-113.9	E101	13.00
—	—	114.0-125.0	E102	13.00
—	—	126.0-138.0	E103	13.00
—	—	139.0-153.0	E104	13.00
—	—	154.0-163.0	E106	13.00
—	—	164.0-180.0	E107	13.00

# Overload Relay Heater Tables

## Full Load Motor Amps, 3-Phase, Trip Class 20 – Tables 233, 238

Selection

Table 233 for Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87 (3-Phase)

Full Load Amps					Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1¼	Size 2, 2½	Size 3, 3½	Size 4		
0.38-0.40	—	—	—	—	E6	13.00
0.41-0.43	—	—	—	—	E7	13.00
0.44-0.48	—	—	—	—	E8	13.00
0.49-0.53	—	—	—	—	E9	13.00
0.54-0.57	—	—	—	—	E11	13.00
0.58-0.62	—	—	—	—	E12	13.00
0.63-0.66	—	—	—	—	E13	13.00
0.67-0.72	—	—	—	—	E14	13.00
0.73-0.80	—	—	—	—	E16	13.00
0.81-0.85	—	—	—	—	E17	13.00
0.86-0.92	—	—	—	—	E18	13.00
0.93-0.99	—	—	—	—	E19	13.00
1.00-1.08	—	—	—	—	E23	13.00
1.09-1.23	—	—	—	—	E24	13.00
1.24-1.37	—	—	—	—	E26	13.00
1.38-1.54	—	—	—	—	E27	13.00
1.55-1.69	—	—	—	—	E28	13.00
1.70-1.80	—	—	—	—	E29	13.00
1.81-1.94	—	—	—	—	E31	13.00
1.95-2.07	—	—	—	—	E32	13.00
2.08-2.26	—	—	—	—	E33	13.00
2.27-2.54	2.27-2.54	—	—	—	E34	13.00
2.55-2.69	2.55-2.69	—	—	—	E36	13.00
2.70-2.88	2.70-2.88	—	—	—	E37	13.00
2.89-3.14	2.89-3.14	—	—	—	E38	13.00
3.15-3.40	3.15-3.40	—	—	—	E39	13.00
3.41-3.81	3.41-3.81	—	—	—	E41	13.00
3.82-4.26	3.82-4.25	—	—	—	E42	13.00
4.27-4.62	4.26-4.62	—	—	—	E44	13.00
4.63-5.09	4.63-5.09	—	—	—	E46	13.00
5.10-5.61	5.10-5.61	—	—	—	E47	13.00
5.62-5.91	5.62-5.91	—	—	—	E48	13.00
5.92-6.15	5.92-6.15	—	—	—	E49	13.00
6.16-6.70	6.16-6.70	—	—	—	E50	13.00
6.71-7.54	6.71-7.54	—	—	—	E51	13.00
7.55-8.29	7.55-8.29	—	—	—	E52	13.00
8.30-8.99	8.30-8.99	—	—	—	E53	13.00
9.00-9.85	9.00-9.85	—	—	—	E54	13.00
9.86-10.4	9.86-10.4	—	—	—	E55	13.00
10.5-12.0	10.5-12.0	10.5-12.0	—	—	E56	13.00
12.1-13.6	12.1-13.6	12.1-13.6	—	—	E57	13.00
13.7-15.6	13.7-15.6	13.7-15.6	—	—	E60	13.00
15.7-17.0	15.7-17.0	15.7-17.1	—	—	E61	13.00
17.1-18.4	17.1-19.4	17.2-19.4	—	—	E62	13.00
18.5-19.4	19.5-20.9	19.5-20.9	—	—	E65	13.00
19.5-21.3	21.0-22.2	21.0-22.2	—	—	E66	13.00
21.4-24.4	22.3-25.3	22.3-25.3	—	—	E67	13.00
24.5-25.9	25.4-26.9	25.4-26.9	30.0-33.5	—	E69	13.00
26.0-27.0	27.0-30.2	27.0-30.2	33.6-36.4	—	E70	13.00
—	—	—	36.5-39.6	—	E71	13.00
—	30.3-33.3	30.3-33.3	—	—	E72	13.00
—	33.4-36.0	33.4-35.3	39.7-43.6	—	E73	13.00
—	—	—	43.7-46.5	—	E73A	13.00
—	—	35.4-41.5	46.6-51.6	—	E74	13.00
—	—	41.6-45.0	51.7-54.4	—	E76	13.00
—	—	—	54.5-58.0	—	E77	13.00
—	—	45.1-52.3	58.1-63.0	—	E78	13.00
—	—	52.4-55.7	63.1-67.7	—	E79	13.00
—	—	55.8-60.0	67.8-72.4	—	E80	13.00
—	—	—	—	—	E88	13.00
—	—	—	—	56.9-60.9	E89	13.00
—	—	—	—	61.0-63.9	E91	13.00
—	—	—	—	64.0-67.7	E92	13.00
—	—	—	—	67.8-72.4	E93	13.00
—	—	—	72.5-80.0	72.5-77.7	E94	13.00
—	—	—	80.1-88.1	77.8-85.9	E96	13.00
—	—	—	88.2-91.5	86.0-91.9	E97	13.00
—	—	—	91.6-96.8	92.0-96.7	E98	13.00
—	—	—	96.9-99.0	96.8-105	E99	13.00
—	—	—	99.1-108.0	—	E101	13.00
—	—	—	—	—	E102	13.00
—	—	—	—	106-115	E103	13.00
—	—	—	—	116-130	E104	13.00

Table 238 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DC	48GC	48HA	48JA		
0.30-0.32	—	—	—	E3	13.00
0.33-0.35	—	—	—	E4	13.00
0.36-0.38	—	—	—	E5	13.00
0.39-0.41	—	—	—	E6	13.00
0.42-0.44	—	—	—	E7	13.00
0.45-0.49	—	—	—	E8	13.00
0.50-0.54	—	—	—	E9	13.00
0.55-0.58	—	—	—	E11	13.00
0.59-0.63	—	—	—	E12	13.00
0.64-0.67	—	—	—	E13	13.00
0.68-0.73	—	—	—	E14	13.00
0.74-0.81	—	—	—	E16	13.00
0.82-0.87	—	—	—	E17	13.00
0.88-0.94	—	—	—	E18	13.00
0.95-1.00	—	—	—	E19	13.00
1.01-1.10	—	—	—	E23	13.00
1.11-1.26	—	—	—	E24	13.00
1.27-1.40	—	—	—	E26	13.00
1.41-1.58	—	—	—	E27	13.00
1.59-1.74	—	—	—	E28	13.00
1.75-1.85	—	—	—	E29	13.00
1.86-1.99	—	—	—	E31	13.00
2.00-2.11	—	—	—	E32	13.00
2.12-2.31	—	—	—	E33	13.00
2.32-2.59	—	—	—	E34	13.00
2.60-2.75	—	—	—	E36	13.00
2.76-2.95	—	—	—	E37	13.00
2.96-3.21	—	—	—	E38	13.00
3.22-3.48	—	—	—	E39	13.00
3.49-3.89	—	—	—	E41	13.00
3.90-4.35	—	—	—	E42	13.00
4.36-4.73	—	—	—	E44	13.00
4.74-5.21	—	—	—	E46	13.00
5.22-5.74	—	—	—	E47	13.00
5.75-6.05	—	—	—	E48	13.00
6.06-6.46	—	—	—	E49	13.00
6.47-6.95	—	—	—	E50	13.00
6.96-8.09	—	—	—	E51	13.00
8.10-9.29	—	—	—	E52	13.00
9.30-10.4	—	—	—	E53	13.00
—	—	—	—	E54	13.00
10.5-10.9	—	—	—	E55	13.00
11.0-12.0	—	—	—	E56	13.00
12.1-14.5	—	—	—	E57	13.00
14.6-16.8	—	—	—	E60	13.00
16.9-18.4	16.9-18.4	—	—	E61	13.00
18.5-20.9	18.5-20.9	—	—	E62	13.00
21.0-22.5	21.0-22.5	—	—	E65	13.00
22.6-24.3	22.6-24.7	—	—	E66	13.00
24.4-27.2	24.8-27.2	27.1-30.0	—	E67	13.00
27.3-29.2	27.3-29.2	30.1-33.2	—	E69	13.00
29.3-30.0	29.3-32.0	33.3-35.7	—	E70	13.00
—	32.1-34.9	35.8-39.4	—	E71	13.00
—	—	39.5-43.4	—	E72	13.00
—	35.0-37.8	43.5-46.9	—	E73	13.00
—	37.9-41.7	—	—	E73A	13.00
—	41.8-45.9	47.0-51.5	—	E74	13.00
—	46.0-49.0	51.6-57.0	—	E76	13.00
—	49.1-54.2	57.1-62.8	—	E77	13.00
—	54.3-60.0	62.9-69.1	—	E78	13.00
—	—	69.2-75.0	—	E79	13.00
—	—	75.1-83.3	—	E80	13.00
—	—	—	50.0-55.9	E88	13.00
—	—	—	56.0-60.9	E89	13.00
—	—	—	61.0-65.9	E91	13.00
—	—	—	66.0-69.9	E92	13.00
—	—	—	70.0-75.9	E93	13.00
—	—	—	76.0-81.9	E94	13.00
—	—	83.4-86.9	82.0-86.9	E96	13.00
—	—	87.0-92.9	87.0-92.9	E97	13.00
—	—	93.0-100.0	93.0-97.9	E98	13.00
—	—	—	98.0-107.9	E99	13.00
—	—	—	108-113.9	E101	13.00
—	—	—	114-125.9	E102	13.00
—	—	—	126-138.9	E103	13.00
—	—	—	139-153.9	E104	13.00
—	—	—	154-163.9	E106	13.00
—	—	—	164-180.9	E107	13.00

# Overload Relay Heater Tables

## Full Load Motor Amps, Single Phase, Trip Class 10 – Tables 313, 316

Selection

Table 313 for Class 14, 22 (1-Phase)

Full Load Amps			Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1P	Size 2, 2½		
1.85-2.05	1.85-2.05	—	K21	13.00
2.06-2.35	2.06-2.35	—	K22	13.00
2.36-2.64	2.36-2.64	—	K24	13.00
2.65-2.96	2.65-2.96	—	K27	13.00
2.97-3.31	2.97-3.31	—	K28	13.00
3.32-3.51	3.32-3.51	—	K29	13.00
3.52-3.87	3.52-3.87	—	K31	13.00
3.88-4.31	3.88-4.31	—	K32	13.00
4.32-4.79	4.32-4.79	—	K33	13.00
4.80-5.21	4.80-5.21	—	K34	13.00
5.22-5.75	5.22-5.75	—	K36	13.00
5.76-6.11	5.76-6.11	—	K37	13.00
6.12-6.95	6.12-6.95	—	K39	13.00
6.96-7.73	6.96-7.73	—	K41	13.00
7.74-8.47	7.74-8.47	—	K42	13.00
8.48-9.52	8.48-9.52	—	K43	13.00
9.53-10.4	9.53-10.4	—	K49	13.00
10.5-11.1	10.5-11.1	—	K50	13.00
11.2-12.4	11.2-12.4	—	K52	13.00
12.5-13.5	12.5-13.5	—	K53	13.00
13.6-15.1	13.6-15.1	—	K54	13.00
15.2-16.6	15.2-16.6	—	K55	13.00
16.7-17.6	16.7-17.6	—	K57	13.00
17.7-18.8	17.7-18.8	18.7-19.7	K58	13.00
18.9-21.6	18.9-21.6	19.8-21.3	K60	13.00
21.7-22.7	21.7-22.7	21.4-22.8	K61	13.00
22.8-25.3	22.8-25.3	22.9-24.2	K62	13.00
—	25.4-26.6	24.3-26.5	K63	13.00
—	26.7-30.1	26.6-29.3	K64	13.00
—	30.2-33.0	29.4-32.0	K67	13.00
—	33.1-34.1	32.1-35.6	K68	13.00
—	—	35.7-37.9	K69	13.00
—	—	38.0-40.3	K70	13.00
—	—	40.4-44.3	K72	13.00
—	—	44.4-49.5	K73	13.00
—	—	49.6-52.1	K74	13.00
—	—	52.2-53.7	K75	13.00
—	—	53.8-60.0	K76	13.00

Table 316 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DA	48GA	48HA	48JA		
1.69-1.88	—	—	—	K21	13.00
1.89-2.05	—	—	—	K22	13.00
2.06-2.21	—	—	—	K23	13.00
2.22-2.44	—	—	—	K24	13.00
2.45-2.70	—	—	—	K26	13.00
2.71-2.92	—	—	—	K27	13.00
2.93-3.27	—	—	—	K28	13.00
3.28-3.56	—	—	—	K29	13.00
3.57-3.83	—	—	—	K31	13.00
3.84-4.23	—	—	—	K32	13.00
4.24-4.57	—	—	—	K33	13.00
4.58-4.97	—	—	—	K34	13.00
4.98-5.67	—	—	—	K36	13.00
5.68-6.11	—	—	—	K37	13.00
6.12-6.91	—	—	—	K39	13.00
6.92-7.65	—	—	—	K41	13.00
7.66-8.4	—	—	—	K42	13.00
8.5-8.9	—	—	—	K43	13.00
9.0-10.1	9.12-9.6	—	—	K49	13.00
10.2-11.2	9.7-10.4	—	—	K50	13.00
11.3-12.3	10.5-11.4	—	—	K52	13.00
12.4-13.3	11.5-12.1	—	—	K53	13.00
13.4-14.1	12.2-12.9	—	—	K54	13.00
14.2-15.0	13.0-13.7	—	—	K55	13.00
15.1-16.2	13.8-14.8	—	—	K56	13.00
16.3-17.5	14.9-16.4	—	—	K57	13.00
17.6-18.6	16.5-18.2	—	—	K58	13.00
18.7-19.9	18.3-19.5	—	—	K60	13.00
20.0-21.3	19.6-20.9	—	—	K61	13.00
21.4-22.8	21.0-22.8	23.2-25.1	—	K62	13.00
22.9-25.1	22.9-24.7	25.2-27.3	—	K63	13.00
25.2-27.6	24.8-27.6	27.4-30.4	—	K64	13.00
27.7-30.0	27.7-30.5	30.5-33.3	—	K67	13.00
—	30.6-33.9	33.4-36.5	—	K68	13.00
—	34.0-37.3	36.6-39.3	—	K69	13.00
—	37.4-40.2	39.4-43.5	—	K70	13.00
—	40.3-41.9	43.6-46.6	43.0-46.5	K72	13.00
—	42.0-45.9	46.7-51.1	46.6-50.9	K73	13.00
—	46.0-50.9	51.2-56.3	51.0-55.9	K74	13.00
—	51.0-52.9	56.4-61.1	56.0-59.1	K75	13.00
—	53.0-57.7	61.2-64.9	59.2-68.7	K76	13.00
—	57.8-60.0	65.0-71.9	—	K77	13.00
—	—	72.0-80.7	68.8-80.7	K78	13.00
—	—	80.8-92.7	80.8-92.7	K85	13.00
—	—	92.8-100.0	92.8-103.9	K86	13.00
—	—	—	104.0-113.5	K87	13.00
—	—	—	113.6-127.9	K89	13.00
—	—	—	128.0-143.9	K92	13.00
—	—	—	144.0-163.9	K94	13.00
—	—	—	164.0-180.0	K96	13.00

# Overload Relay Heater Tables

## Full Load Motor Amps, 3-Phase, Trip Class 10 – Tables 332, 335

Selection

Table 332 for Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87 (3-Phase)

Table 335 for Class 48

Full Load Amps					Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1¼	Size 2, 2½	Size 3, 3½	Size 4		
1.52-1.65	1.52-1.65	—	—	—	K21	13.00
1.66-1.79	1.66-1.79	—	—	—	K22	13.00
1.80-1.94	1.80-1.94	—	—	—	K23	13.00
1.95-2.15	1.95-2.15	—	—	—	K24	13.00
2.16-2.37	2.16-2.37	—	—	—	K26	13.00
2.38-2.56	2.38-2.56	—	—	—	K27	13.00
2.57-2.87	2.57-2.87	—	—	—	K28	13.00
2.88-3.13	2.88-3.13	—	—	—	K29	13.00
3.14-3.37	3.14-3.37	—	—	—	K31	13.00
3.38-3.72	3.38-3.72	—	—	—	K32	13.00
3.73-4.00	3.73-4.00	—	—	—	K33	13.00
4.01-4.35	4.01-4.35	—	—	—	K34	13.00
4.36-4.99	4.36-4.99	—	—	—	K36	13.00
5.00-5.38	5.00-5.38	—	—	—	K37	13.00
5.39-5.79	5.39-5.79	—	—	—	K39	13.00
5.80-6.43	5.80-6.43	—	—	—	K41	13.00
6.44-6.83	6.44-6.83	—	—	—	K42	13.00
6.84-7.83	6.84-7.83	—	—	—	K43	13.00
7.84-8.23	7.84-8.23	—	—	—	K49	13.00
8.24-9.59	8.24-9.59	—	—	—	K50	13.00
9.60-9.90	9.60-9.90	—	—	—	K52	13.00
10.0-10.7	10.0-10.7	—	—	—	K53	13.00
10.8-11.6	10.8-11.6	12.1-12.7	—	—	K54	13.00
11.7-12.3	11.7-12.3	12.8-13.5	—	—	K55	13.00
12.4-13.4	12.4-13.4	13.6-14.6	—	—	K56	13.00
13.5-14.2	13.5-14.2	14.7-15.9	—	—	K57	13.00
14.3-15.1	14.3-15.1	16.0-16.9	—	—	K58	13.00
15.2-17.5	15.2-17.5	17.0-18.2	—	—	K60	13.00
17.6-18.7	17.6-18.7	18.3-19.5	—	—	K61	13.00
18.8-20.0	18.8-20.0	19.6-20.9	—	—	K62	13.00
20.1-21.5	20.1-21.5	21.0-23.1	—	—	K63	13.00
21.6-23.9	21.6-23.9	23.2-25.4	—	—	K64	13.00
24.0-25.8	24.0-25.8	25.5-27.9	—	—	K67	13.00
—	—	28.0-30.5	—	—	K68	13.00
—	—	—	—	—	K69	13.00
—	29.6-32.7	30.6-33.5	36.8-40.0	—	K70	13.00
—	32.8-36.0	33.6-37.2	40.1-42.4	—	K72	13.00
—	—	37.3-40.7	42.5-46.3	—	K73	13.00
—	—	40.8-43.0	46.4-49.6	—	K74	13.00
—	—	43.1-47.9	49.7-52.3	49.7-52.3	K75	13.00
—	—	48.0-52.7	52.4-57.5	52.4-57.5	K76	13.00
—	—	52.8-58.3	57.6-63.9	57.6-63.0	K77	13.00
—	—	58.4-60.0	64.0-67.9	63.1-68.1	K78	13.00
—	—	—	68.0-74.3	68.2-74.3	K83	13.00
—	—	—	74.4-77.9	74.4-79.9	K85	13.00
—	—	—	78.0-83.1	80.0-87.4	K86	13.00
—	—	—	83.2-91.4	87.5-90.0	K87	13.00
—	—	—	91.5-99.9	90.1-100.0	K88	13.00
—	—	—	100.0-108.0	100.1-108.0	K89	13.00
—	—	—	—	108.1-119.0	K90	13.00
—	—	—	—	119.1-130.0	K92	13.00
—	—	—	—	—	K94	13.00
—	—	—	—	—	K96	13.00

Full Load Amps				Heater Catalog No	List Price \$
48DC	48GC	48HA	48JA		
1.56-1.69	—	—	—	K21	13.00
1.70-1.84	—	—	—	K22	13.00
1.85-1.98	—	—	—	K23	13.00
1.99-2.19	—	—	—	K24	13.00
2.20-2.43	—	—	—	K26	13.00
2.44-2.63	—	—	—	K27	13.00
2.64-2.95	—	—	—	K28	13.00
2.96-3.21	—	—	—	K29	13.00
3.22-3.45	—	—	—	K31	13.00
3.46-3.81	—	—	—	K32	13.00
3.82-4.10	—	—	—	K33	13.00
4.11-4.46	—	—	—	K34	13.00
4.47-5.10	—	—	—	K36	13.00
5.11-5.49	—	—	—	K37	13.00
5.50-6.21	—	—	—	K39	13.00
6.22-6.76	—	—	—	K41	13.00
6.77-7.62	—	—	—	K42	13.00
7.63-8.07	—	—	—	K43	13.00
8.08-9.19	—	—	—	K49	13.00
9.20-10.0	—	—	—	K50	13.00
10.1-11.0	—	—	—	K52	13.00
11.1-12.0	—	—	—	K53	13.00
12.1-12.7	—	—	—	K54	13.00
12.8-13.5	—	—	—	K55	13.00
13.6-14.5	—	—	—	K56	13.00
14.6-15.7	—	—	—	K57	13.00
15.8-16.7	—	—	—	K58	13.00
16.8-17.9	—	—	—	K60	13.00
18.0-19.2	18.0-19.2	—	—	K61	13.00
19.3-20.5	19.3-20.5	23.2-25.1	—	K62	13.00
20.6-22.5	20.6-22.5	25.2-27.3	—	K63	13.00
22.6-24.8	22.6-24.8	27.4-30.4	—	K64	13.00
24.9-27.6	24.9-27.6	30.5-33.3	—	K67	13.00
27.7-30.0	—	33.4-36.5	—	K68	13.00
—	27.7-30.1	36.6-39.3	—	K69	13.00
—	30.2-33.1	39.4-43.5	—	K70	13.00
—	33.2-36.7	43.6-46.6	43.0-46.5	K72	13.00
—	36.8-40.1	46.7-51.1	46.6-50.9	K73	13.00
—	40.2-45.5	51.2-56.3	51.0-55.9	K74	13.00
—	45.6-47.9	56.4-61.1	56.0-59.1	K75	13.00
—	48.0-52.7	61.2-64.9	59.2-68.7	K76	13.00
—	52.8-55.1	65.0-71.9	—	K77	13.00
—	55.2-60.0	72.0-80.7	68.8-80.7	K78	13.00
—	—	80.8-92.7	80.8-92.7	K85	13.00
—	—	92.8-100.0	92.8-103.9	K86	13.00
—	—	—	104.0-113.5	K87	13.00
—	—	—	113.6-127.9	K89	13.00
—	—	—	128.0-143.9	K92	13.00
—	—	—	144.0-163.9	K94	13.00
—	—	—	164.0-180.0	K96	13.00

CONTROL PRODUCTS

NEMA & General Purpose Control